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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------|-------------|----------------------|---------------------|------------------|
| 10/691,956 | 10/23/2003 | Larry T. Clark | 7784-131/DVA | 6321 |
| 27572 | 7590 | 11/12/2004 | EXAMINER | |
| HARNESS, DICKEY & PIERCE, P.L.C. | | | GARTENBERG, EHUD | |
| P.O. BOX 828 | | | ART UNIT | |
| BLOOMFIELD HILLS, MI 48303 | | | PAPER NUMBER | |

3746

DATE MAILED: 11/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/691,956

Applicant(s)

CLARK, LARRY T.

Examiner

Ehud Gartenberg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 1-5 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 10/22/2004.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because Figures 2A, 2B, and 5 fail to show the unsteady flow ejector, in particular the geometry of the blades, in a fashion that will enable one of ordinary skill in the art to make and use the claimed invention. As an example of the inadequacy of the drawings, Applicant's attention is drawn to Fig. 2B, wherein the arrow pointing to cavity 52 and the arrow pointing to the relieved portion 50 point to the same surface. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 6-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 6 claims *inter alia*, "an unsteady flow ejector having a multi-bladed rotor, the rotor being disposed within the primary flow and rotating in response to a transfer of momentum therefrom, the rotor employing the primary flow to generate a plurality of high velocity , low density rotating jets and a plurality of low pressure voids, each of the voids being spaced between an associated pair of the jets, the unsteady flow ejector being selectively operable for entraining a secondary flow of air into voids;". It is not

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clear how to make and use the claimed invention, in particular how one of ordinary skill in the art would make the claimed jets and voids, how would one of ordinary skill in the art would recognize that he indeed made said jets and voids, and what is the difference between the claimed invention and the resultant flow from a free-spinning fan mounted in the same location of a jet engine as the claimed invention. Documentary evidence is required. In this respect, and with regard to the lack of enablement of the disclosure, the following points are raised:

I) on p. 6, ll. 10 - 15 state: "Each of the jets 32 flows through the unsteady flow ejector 10 in the thrust direction so as not to require the use of additional flow momentum to re-direct the mixed flow 20. Stated another way, although the pattern of total temperature, pressure and other scalar properties tends to move in a spiral manner, flow velocity is directed axially in the thrust direction". As is well known, any flow is controlled by pressure gradients. If the pressure pattern moves in a spiral manner, the disclosure is not enabling how this motion would not influence the velocity vector.

II) on p. 6, ll. 19-23 state: "Entrainment of the secondary flow 18 is dominated by static pressure momentum interchange which occurs in an essentially isentropic manner.

Accordingly, the losses that result from the mixing process are relatively small as compared to other known mixing devices and ejectors which employ shear forces to mix flows." In this respect, the specification is not enabling the following aspects: A) if the process is isentropic, then by definition it is adiabatic and reversible; applicant is required to prove that this claimed phenomenon occurring in open air is indeed adiabatic, i.e., it does not exchange heat with its surroundings, that it is reversible, and

how this reversibility can be accomplished. B) If the process is isentropic, i.e., incurs no losses, then how it happens that the mixing process incurs losses. C) What are “the other known devices ... which employ shear forces to mix flows” and does the Applicant state that his device does not cause shear forces in the flow. How does Applicant define “shear forces”, what causes them, and what makes the Applicant believe that his invention does not cause shear forces in the flow.

III) on p. 7, ll. 1-7 state: “The temperature and density differentials between the jets 32 and the entrained portion 18a of the secondary flow 18 set up a phenomenon known as Taylor instability, which causes the primary air flow 12 and the entrained portion 18a of the secondary flow 18 to mix. Mixing occurs when the interface instability causes the jets 32 and the entrained portion 18a of the secondary flow 18 to breakup as the low density jets push through the higher density entrained portion 18a of the secondary flow 18.” A) Applicant is required to explain what he means by the “Taylor instability”, what is the nature and behavior of the interface instability, why should it occur at all, how one would recognize it, and what does he mean by “Mixing occurs when the interface instability causes the jets 32 and the entrained portion 18a of the secondary flow 18 to breakup as the low density jets push through the higher density entrained portion 18a of the secondary flow 18.” In particular it is not clear what is the nature of this “Taylor instability”, what ensures that it will happen, or conversely, are there any conditions that would prevent it from happening. B) How does Applicant practice the invention such that the jets are of low density and the entrained portion is of a higher density. Documentary evidence is required.

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IV) on p. 7, ll. 8-15 state: "In order to place the unsteady flow ejector 10 behind the turbojet engine 16, the unsteady flow ejector must be able to entrain the secondary flow 18 from the ambient by turning it from the free stream direction radially down into an ejector-mixer and then turn it back into the thrust direction. This turning must be done as efficiently as possible. There must be no flow separation. Furthermore, the jets 32 must be smoothly formed from the primary flow 12 with minimum losses. These jets 32 must flow in the thrust direction so that no additional flow momentum will be needed to align them in the thrust direction." This entire paragraph recites desired results, but gives no teachings on how to make and practice them. For example: how to prevent flow separation or how to smoothly form the jets with minimum losses. As previously stated, this entire paragraph is not enabling, and each statement has to be enabled.

V) on p. 7, l. 21, the quoted angle of 60 degrees is not defined relative to a reference line.

VI) on p. 7, l. 23 to p. 8, l. 4, enablement is not provided for the determination of the number of the blades, the shape of the blades 40, and the rotational speed to "allow enough time and room for the entrained portion 18a of the secondary flow 18 to move into the low pressure voids 34." Documentary evidence is required.

VII) on p. 8, ll. 4-12, state "The end portion 46 is uniform in the circumferential direction so that no torques, other than that which results from skin friction, is applied to the rotor 30 as it rotates." However, two lines below it is stated that: "Configuration of the rotor 30 in this manner causes the free-spinning rotor 30 to rotate at speed which balances the static pressure in the circumferential direction between the suction and pressure

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surfaces of the blades 40." It is not clear whether the rotor rotates under frictional or pressure forces, because the two statements seem to be contradictory. In this respect Applicant is required to explain in very clear and unequivocal terms what is the role of the skin friction and of the pressures in the balance of forces that rotates the claimed invention.

The lack of enablement of the disclosure makes it impossible to apply prior art. However, to the extent that the specification could be understood, a search has been performed and the following rejection is made. The difficulty in applying prior art is caused by: 1) lack of geometrical description / limitations of the claimed invention; 2) the description / specification of the invention in terms of what it does (desired results) rather than what it is.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 6-13 are provisorily rejected under 35 U.S.C. 103(a) as being unpatentable over Paulson 5,203,164, that teaches the invention as disclosed and as claimed: a jet engine (col. 2, ll. 8-9) conventionally having a combustor and a turbine, comprising an unsteady flow ejector 149 (Fig. 12 and col. 11, l. 36 et seq.), and being operable in a first mode wherein a secondary flow of ambient air 184 is entrained into

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the jets between the blades to attenuate the noise of the air exiting the jet (see Abstract). Note that the number of the blades and their pitch is an obvious matter of design choice, to obtain the proper rotational speed and desired characteristics (col. 7, l. 1 et seq.). Regarding the claimed language "the rotor employing a primary flow to generate a plurality of high velocity jets and a plurality of low pressure voids, each of the voids spaced between an associated pair of the jets, the unsteady flow ejector being selectively operable for entraining a secondary flow of air into the voids;" Paulson produces said jets by dividing the main jet into a number of jets by the passing frequency of the blades, the voids are produced on the downstream side of the blades because of the inherent power extraction from the jet by the blades (the decrease in pressure is converted into local forces along the blade and torque), and this pattern entrains the secondary air into the voids, thus lowering the overall velocity and level of noise produced by the jet's shear layer (col. 6, ll. 46-51 and col. 7, ll. 7-12). Note that in all free-rotating turbines or fan, there is an inherent pressure drop across the blade, otherwise under pressure equilibrium the blade wouldn't rotate. Note that as claimed, both claims 6 and 7 read on Paulson, because the by-pass duct of Paulson bypasses the combustor (col. 6, l. 3 et seq.).

Claim 13 is incomprehensible in view of the lack of details of the drawings (see objection to the drawings above).

Allowable Subject Matter

7. Claims 8-12 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yuan 3,692,259, col. 1, ll. 25-31 gives an explanation of the flow field around a finite-span wing, of the kind that the Applicant employs for his blades. Note that his description parallels the claim language of the present application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ehud Gartenberg whose telephone number is 703/308-2634. The examiner can normally be reached on Monday-Thursday.

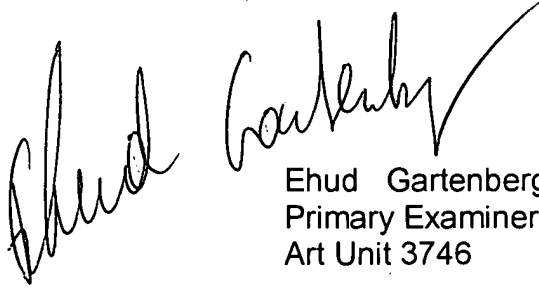
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on 703/306-2772. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Ehud Gartenberg
Primary Examiner
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